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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/755,282 | 01/08/2001 | Sheng-Hsiung Chen | TS99-149B | 6859 |

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EXAMINER

MITCHELL, JAMES M

ART UNIT PAPER NUMBER

2813

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 09/755,282 | Applicant(s) CHEN, SHENG-HSIUNG | |
| | Examiner James M. Mitchell | Art Unit 2813 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 34-38, 40, 41, 43-46, 48 and 49 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 37 is/are allowed.
- 6) ☒ Claim(s) 34, 38, 40, 41, 43-46, 48 and 49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the amendment filed December 20, 2004.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 46, 48, 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsumoto (U.S. 4,984,061).

Matsumoto (Fig 1, 2) disclose a bond pad for a semiconductor device, the structure comprising a first metal layer (18-1..18-8) overlying an insulating material (16-1... 16-8), a plurality of vertical structures (20-3) extending from first metal upward and separated from each other by exposed portions (i.e. gap between) and protects underlying layers and therefore is a passivating material, and a second metal (22) layer covering the vertical structures and the exposed portions of the first metal layer, wherein the (i.e. bottom portion) second metal substantially conforms to a nonplanar shape provided by the vertical structures and a third metal layer (25) covering the second metal layer, wherein the third metal forms a part of the member (i.e. vertical members within outer perimeter) that surrounds and rises above each of the vertical structures; (cl. 48) wherein

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the second metal is substantially the same thickness over both the vertical and exposed portions; and wherein the vertical portions are substantially the same size.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 34, 35, 38, 40, 41, 44, 45 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan (U.S. 6,002,179) in combination with Saran et al. (U.S. 6,448,650).

Chan (Fig. 3, 4, 7, 8) discloses a bond pad structure comprising an insulator (73) adjacent to a semiconductor substrate, a metal wiring layer (not seen; i.e. pad transports input and output signals to internal circuits; Col. 4, Lines 26-29) adjacent to the insulator semiconductor substrate (abstract), [also cl. 36] a passivating layer (36, 96;"polysilicon"; col. 3, Lines 17-19) adjacent to metal wiring, wherein the at least a portion of the passivation layer is configured to provide a plurality of island structures (36) by spaces that exposes portion of the underlying layer (i.e. contact, 92) in contact with underlying metal), a metal barrier ("TiN"; Col. 1, Lines 31-34) covering the passivation layer and conforming

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to a shape separated by openings in said passivating layer,; (cl. 35,38,44

wherein pad is formed of aluminum and copper ("TiN/Al.... Cu/TiN/Ti")

Chan discloses the same invention, as applicant except the barrier used is TiN, instead of TaN. Saran (Col. 4<lines 15-19) shows that TiN and TaN are equivalent barrier structures known in the art known in the art for bond pads. Therefore, because these two barrier structures are art recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute a wire TaN for TiN.

Although Chan does not expressly show the thickness of its barrier layer, it would have been an obvious to form the barrier uniform, since it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Claims 36 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan (U.S. 6,002,179) and Saran et al. (U.S. 6,448,650) as applied to claims 34 and 40.

Neither Chan nor Saran indicates that its insulating material may be silicon oxide. Suwanai (CLM 34 of Suwanai) teaches insulating silicon oxide.

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It would have been obvious to one of ordinary skill in the art to form the insulating island material of Chan with silicon oxide, in order to provide an insulating material as required by Chan (abstract).

Allowable Subject Matter

Claim 37 is allowable.

The following is a statement of reasons for the indication of allowable subject matter: the prior art does not disclose or make obvious the interlocking grid array in the bond pad having contact region, which is approximately 100 by 100 microns square and the size of the island structures are from about 10 to 25 microns in width, approximately 4 microns in height, and from about 4 to 10 in number, of interlocking grid structures, increasing surface area for improved adhesion including all the limitations of the independent claim.

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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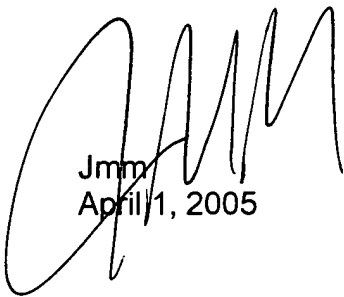
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jmm
April 1, 2005



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